

**AMENDMENTS TO THE CLAIMS:**

Please replace the claims with the claims provided in the listing below wherein status, amendments, additions and cancellations are indicated.

1. (Currently Amended) A video game system, comprising:

[[A]] a three-dimensional image processing apparatus for generating a shadow model of a solid model formed by polygons each having vertex normal vectors, ~~comprising:~~ including:

vertex sorting means for sorting [[the]] respective vertices of the polygons forming the solid model into visible-surface vertices facing in a direction toward a light source and hidden-surface vertices facing in a direction opposite from the light source, and

said solid model being a character movable in a height direction in a simulated 3D space such that the character as a whole rises above and leaves a ground surface in the simulated 3D space; and

shadow model generating means for deforming the solid model by moving the hidden-surface vertices in a propagating direction of rays from the light source to produce a deformed shadow on the ground surface reflecting a distorted shape of the character when the character as a whole rises above and leaves the ground surface.

2. (Currently Amended) ~~A The three-dimensional image processing apparatus~~ video game system according to claim 1, wherein the vertex sorting means sorts the vertices into the visible-surface vertices and the hidden-surface vertices based on whether an inner product of a normal vector of each vertex of each polygon and a light source vector representing the propagating direction of the rays from the light source is a positive or negative value.

AI  
Cmt

3. (Currently Amended) ~~A three-dimensional image processing apparatus~~ The video game system according to claim 1, wherein the shadow model generating means moves specified vertices in parallel with the propagating direction of the rays from the light source.

4. (Currently Amended) ~~A three-dimensional image processing apparatus~~ The video game system according to claim 1, wherein the shadow model generating means narrows distances between [[the]] specified vertices such that the hidden-surface vertices of the shadow model having the visible-surface vertices define a shape tapered in a moving direction.

5. (Currently Amended) ~~A three-dimensional image processing apparatus~~ The video game system according to claim 1, wherein the shadow model generating

means widens distances between [[the]] specified vertices such that the hidden-surface vertices of the shadow model having the visible-surface vertices define a shape swollen in a moving direction.

6. (Currently Amended) ~~A three-dimensional image processing apparatus~~  
The video game system according to claim 1, further comprising shadow creating means for sorting the polygons forming the shadow model into front-facing polygons facing in a direction toward a viewpoint of a virtual camera and back-facing polygons facing in a direction opposite from the viewpoint of the virtual camera, and creating a shadow image in pixels which are pixels corresponding to the front-facing polygons minus pixels corresponding to the back-facing polygons.

7. (Currently Amended) ~~A three-dimensional image processing apparatus~~  
The video game system according to claim 1, further comprising:

shadow creating means for creating a shadow image of the solid model using the shadow model,

first storage means for storing the created shadow image of the solid model,

second storage means for applying rendering to the polygon models except the shadow model and storing the thus created image, and

combining means for reading and combining the image stored in the first storage means and the one stored in the second storage means.

8. (Cancelled)

9. (Currently Amended) A readable storage medium storing a three-dimensional image processing program for a video game system to generate ~~generating~~ a shadow model of a solid model formed by polygons each having vertex normal vectors, the program comprising the steps of:

vertex sorting processing for sorting ~~[[the]]~~ respective vertices of the polygons forming the solid model into visible-surface vertices facing in a direction toward a light source and hidden-surface vertices facing in a direction opposite from the light source, ~~[[and]]~~

said solid model being a character movable in a height direction in a simulated 3D space such that the character as a whole rises above and leaves a ground surface in the simulated 3D space; and

shadow model generating processing for deforming the solid model by moving the hidden-surface vertices in a propagating direction of rays from the light source to produce a deformed shadow on the ground surface having a distorted shape of the character when the character as a whole rises above and leaves the ground surface.

10. (Original) A readable storage medium according to claim 9, wherein the vertex sorting processing is performed to sort the vertices into the visible-surface

vertices and the hidden-surface vertices based on whether an inner product of a normal vector of each vertex of each polygon and a light source vector representing the propagating direction of the rays from the light source is a positive or a negative value.

11. (Original) A readable storage medium according to claim 9, wherein the shadow model generating processing is performed to move specified vertices in parallel with the propagating direction of the rays from the light source.

al  
amt

12. (Currently Amended) A readable storage medium according to claim 9, wherein the shadow model generating processing is performed to narrow distances between ~~[[the]]~~ specified vertices such that the hidden-surface vertices of the shadow model having the visible-surface vertices define a shape tapered in a moving direction.

13. (Currently Amended) A readable storage medium according to claim 9, wherein the shadow model generating processing is performed to widen distances between ~~[[the]]~~ specified vertices such that the hidden-surface vertices of the shadow model having the visible-surface vertices define a shape swollen in a moving direction.

14. (Original) A readable storage medium according to claim 9, wherein the program further comprises a shadow creating processing for sorting the polygons forming the shadow model into front-facing polygons facing in a direction toward a viewpoint of a virtual camera and back-facing polygons facing in a direction opposite from the viewpoint of the virtual camera, and creating a shadow image in pixels which are pixels corresponding to the front-facing polygons minus pixels corresponding to the back-facing polygons.

al  
amt

15. (Original) A readable storage medium according to claim 9, wherein the program further comprises a shadow creating processing for creating a shadow image of the solid model using the shadow model, and a combining processing for storing the created shadow image of the solid model and an image created by applying rendering to the polygon models except the shadow model, and reading and combining the two stored images.

16. (Cancelled)

17. (Currently Amended) A three-dimensional image processing method for a video game system to generate ~~generating~~ a shadow model of a solid model formed by polygons each having vertex normal vectors, said method comprising the steps of:

sorting the respective vertices of the polygons forming the solid model into visible-surface vertices facing in a direction toward a light source and hidden-surface vertices facing in a direction opposite from the light source, [[and]]

said solid model being a character movable in a height direction in a simulated 3D space such that the character as a whole rises above and leaves a ground surface in the simulated 3D space; and

deforming the solid model by moving the hidden-surface vertices in a propagating direction of rays from the light source to produce a deformed shadow on the ground surface having a distorted shape of the character when the character as a whole rises above and leaves the ground surface.

al  
amt

18. (Currently Amended) A video game system comprising:

a three-dimensional image processing apparatus for generating a shadow model of a solid model formed by polygons each having vertex normal vectors, including:

vertex sorting means for sorting [[the]] respective vertices of the polygons forming the solid model into visible-surface vertices facing in a direction toward a light source and hidden-surface vertices facing in a direction opposite from the light source, [[and]]

said solid model being a character movable in a height direction in a simulated 3D space such that the character as a whole rises above and leaves a ground surface in the simulated 3D space, and

shadow model generating means for deforming the solid model by moving the hidden-surface vertices in a propagating direction of rays from the light source to produce a deformed shadow on the ground surface having a distorted shape of the character when the character as a whole rises above and leaves the ground surface,

image display means for displaying images,

program storage means storing a game program data, and

externally operable operation means,

wherein the three-dimensional image processing apparatus displays images on the image display means in accordance with the game program data.

19. (New) A video game system comprising:

a three-dimensional image processing apparatus for generating a shadow model of a solid model formed by polygons each having vertex normal vectors, said 3D image processing apparatus including:

vertex sorting means for sorting respective vertices of the polygons forming the solid model into visible-surface vertices facing in a direction toward a



light source and hidden-surface vertices facing in a direction opposite from the light source;

said solid model being a character movable in a height direction in a simulated 3D space such that the character as a whole rises above and leaves a ground surface in the simulated 3D space; and

shadow model generating means for deforming the solid model by moving the hidden-surface vertices in a propagating direction of rays from the light source to produce a deformed shadow on the ground surface having a distorted shape of the character when the character as a whole rises above and leaves the ground surface; and

image display means for displaying images;

program storage means for storing a game program data;

a memory unit including a shadow model generating section having a hidden-surface magnification data portion which stores magnification rates at which the hidden-surface vertices are magnified in 3D space; and

externally operable operation means, and

wherein the three-dimensional image processing apparatus displays images on the image display means in accordance with the game program data.

20. (New) The video game system according to claim 19, wherein said shadow model generating section includes a hidden-surface parallel movement data

portion which stores data indicating a degree of movement of the hidden-surface vertices in parallel in the propagating direction of the rays from the light source.

21. (New) The video game system according to claim 19, where in said

hidden-surface magnification data portion stores the magnification rates in X-axis, Y-axis, and Z-axis, respectively, at which the hidden-surface vertices are magnified

in said X,Y, and Z axis in the 3D space.

---

al  
cmd